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Electrical physics learning dl model using crocodile physics 605 software Budi Darma University

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ABSTRACT: An understanding of the application of learning in the mastery of electrical physics material is very necessary, with the discovery learning model it is expected that students understand the basic concepts of theory, calculations and train to be more independent individually and in groups. So far, students are very confused and don't know how to analyze problems and discuss the questions they receive. In the current development of information technology media for the teaching and learning process, there are many uses of virtual nature, simulations to explain, analyze, prove a theory or calculate for the application of everyday life. In this study, researchers tried to apply crocodile physics software to teaching electro physics course material at Budi Darma University.
Keywords: Crocodile Physics, Discovery Learning, Electrical Physics

1. INDTRODUCTION

Physics is considered challenging because students must simultaneously manage multiple representations and tasks, including memorizing formulas, using formulas in calculations, conducting experiments, creating graphs, and offering conceptual justifications. Physics is already challenging, but students have difficulty changing different representations, [1] The majority of students achieve poorer learning outcomes in physics compared to other disciplines. Lack of use of teaching materials during the learning process is one of several variables that contribute to low learning outcomes. Learning media are media, both physical and virtual, which are deliberately used as a bridge between teachers and students to help them absorb information in a more effective and efficient way. The media is very important in the field of education, [2]. Several previous studies have shown that the use of simulation media in the classroom has an impact. Because there aren't enough engaging learning tools to use with students, they are less engaged. To create teaching materials that meet curriculum requirements, teachers must consider the needs of their students, [3]. This can be achieved by utilizing computer technology as a medium for learning activities. Discovery Learning (DL) learning methodology is used to ask students to actively reconstruct their knowledge through research-based activities. Long term memory will give importance to the results. The discovery learning paradigm basically develops students' skills to ask questions, observe, gather knowledge,

Software created with Crocodile Physics 6.0.5 is an applicable medium. Software in the form of this simulation involves students in the learning process by giving them the opportunity to participate more actively in carrying out live simulations to connect their knowledge with its application in real-world situations, [5]. Research related to the use of discovery learning learning media and the use of crocodile physics software, Development of POE-based crocodile physics practicum e-modules on electromagnetic induction material, [4], Virtual crocodile physics 605 laboratory training at MGMP physics SMA Karawang regency, [6], Use of software crocodile physics 6.0.5 in learning physics subject to uniformly changing straight motion (GLBB),[3], Crocodile physics media for learning physics teachers during a pandemic, [7]. Therefore, this study aims to determine the level of understanding of Budi Darma University students studying and increasing their understanding of electrical physics course material with Crocodile physics 6.0.5 software.

Learning Discovering Learning

Learning is a process of communication. The communication process always involves three main

components, namely the sender or teacher component, the message recipient component or students, and the student component itself which is usually in the form of subject matter. According to researchers, communication failure often occurs in the learning process, meaning that the subject matter or messages conveyed by the teacher cannot be received by students optimally, [7] There are several advantages or advantages of the discovery learning model, including making students more active because they find out independently, investigate on their own, enable students to analyze and solve problems independently without having to wait for the teacher's explanation [2]

Media Crocodile physics

It allows students to see a real picture of the material being studied, understanding is easier to digest and keep in mind, this is because students are already interested and interested in participating in learning activities. Based on his research, it was found that the use of Crocodile physics media can increase students' interest in learning science, and learning is not boring and the delivery of information is more memorable and meaningful to students, [12].

The advantages of crocodile physics are as follows, [4]:

1. Providing a virtual lab laboratory environment for physics subjects to make it easier for students to understand the content of the material.
2. It is not wrong to use materials and methods for preparing circuit paths in practicum activities, especially in the field of electronics.
3. Minimizing device damage in the event of a circuit fault.
4. This program is also equipped with a tutorial that will guide the user to prepare the desired model.
5. In each simulation buttons are provided to set the simulation.

Disadvantages Crocodile physics

The disadvantages of crocodile physics are as follows:

1. Requires special knowledge and skills about crocodile physics learning media before using it.
2. It is only available in English, so students must interpret it first to understand the material and practice in the crocodile physics learning media.

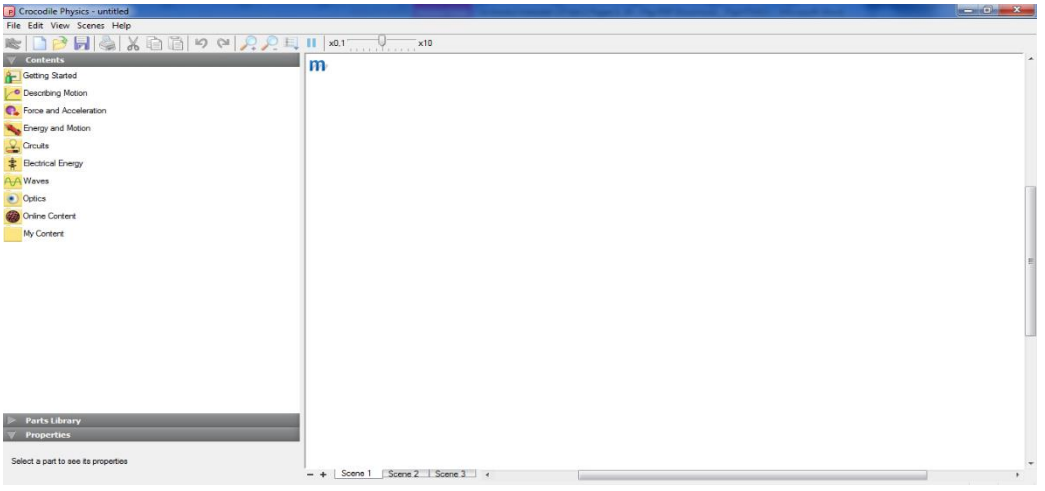

Figure 1: Crocodile physics Worksheet

2. RESEARCH METHOD

The implementation method in this research activity consists of:

1. Application of Discovery Learning (DL) learning in electro Physics lecture material
2. Formulation of a literature review of electro physics lecture material consisting of electricity, magnetism and others.

3. Installing crocodile physisc 6.0.5 software on student laptops
4. Data input and electrical logic, magnetism to crocodile physics 6.0.5 software
5. Output display of electrical physics lecture simulation material.

The description of the research stages is as follows:

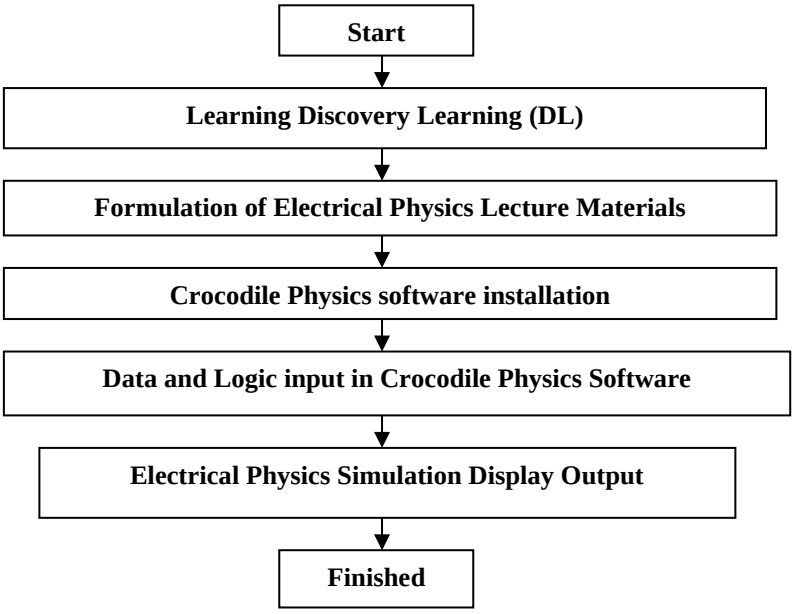

Figure 2. Flowchart of Research Implementation Methods

3. RESULTS AND DISCUSSION

Before learning using Crocodile Physics 6.0.5 software, students are first given an initial test to determine student abilities.
Based on the research results, the learning outcomes data were obtained as shown in table 1.

Table 1: Data on Student Learning Outcomes

NO	PRETEST	CYCLE I	CYCLE II
1	40	60	70
2	50	70	70
3	50	50	60
4	60	80	90
5	50	60	80
6	40	60	60
7	80	80	90
8	50	60	80
9	40	50	70
10	40	50	60
11	80	80	90
12	60	60	80
13	50	50	60
14	50	60	70
15	80	80	90
16	50	60	80
17	50	60	70
18	60	70	80
19	80	90	90
20	40	50	70
21	50	60	80

22	60	70	80
23	80	80	90
24	80	80	90
25	60	60	80
26	50	60	70
27	60	60	80
28	80	90	90
29	60	70	80
30	80	80	80
AMOUNT	1760	1990	2330
AVERAGE	58.66667	66.33333	77.66667

Based on the table above, it can be seen that student learning outcomes increased from the pre-test, post-test cycle I to post-test cycle II. This is indicated by the average student score of 58.67 (pre-test) increased to 66.33 (post-test cycle I) and again increased to 77.67 (post-test cycle II). In addition to being seen in the average student. The pre-test results showed that 8 out of 30 students who took the test completed their studies and 22 students did not complete them. With a passing percentage of 26.67%, the results of the final cycle I exam, 14 out of 30 students who passed the exam completed their exams and 16 students did not complete their exams with an average of 46.67%. increased again in the results of the post test cycle II, 26 students completed their study of the 30 students who took the test with a passing rate of 86.67%. Then there is an increase in learning outcomes from the pre test to the post test cycle II by 60%. As explained above, student involvement in completing activities shows growth in each activity. Positive changes in student performance also affect learning outcomes and learning integrity. It's easier to do it in the table below:

Table 2: Average Student Learning Outcomes

Activity	Number of students who completed	Percentage (%)	Learning outcomes	% Improved Learning Outcomes
Pretest	8	26,67	58,77	-
Cycle I	14	46,67	66,33	13.06
Cycle II	26	86,67	77,67	17.09

4. CONCLUSIONS AND SUGGESTIONS

Based on the results of the research and discussion, it can be concluded that Crocodile physics simulation in the Discovering Learning model can improve learning outcomes in Electrical Physics at Budi Darma University The average student learning outcomes increased from the pre-test 58.77 to 66.33 in cycle I or an increase of 13.06%, from 66.33 in cycle I to 77.67 in cycle II or an increase of 17.09% when compared to pre test with cycle II then increased 30.15%. While learning completeness increased from the pre test 26.67 to 46.67 in cycle I, in cycle II to 86.67 when compared with the pre test, it experienced an increase of 60%.

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